This plexus in the larger tubes is reinforced by blood-vessels derived from numerous leaflets which surround the bronchial tubes; straight vessels penetrate from these leaflets through the walls of the bronchial tubes, to reach the plexus in the mucous membrane.

On the external surface of the bronchial tubes, numerous radiating vessels collect the blood from the plexus in the mucous membrane, and the trunks of these radiating vessels soon terminate in the veins, already described as coming into contact with the under surface of the bronchial tube.

The vessels which have been alluded to as receiving their tributaries in the interlobular surfaces, collect their blood from all the surrounding lobules; consequently the blood which reaches the vein placed in contact with a particular bronchial tube, is not derived exclusively from the same lobules as those with which that bronchial tube and its accompanying artery are in connexion, but it receives its blood from all parts of the lungs promiscuously.

The pulmonary veins accompanying the bronchial tubes continue to increase in size in proportion as the tubes themselves increase, and finally they terminate in the large veins which enter the left auricle.

XVII. "On the Curvature of the Indian Arc." By the Venerable J. H. Pratt, Archdeacon of Calcutta. Communicated by Prof. Stokes, Sec. R.S. Received Sept. 3, 1860.

(Abstract.)

This communication completes the series of the author's papers on the subject of the Indian Arc. He commences by recapitulating the chief results of his former calculations, and adverting to the attempt which he made in his former papers to explain the difficulty which those calculations brought to light, namely, that the amplitudes of the arcs from Kaliana to Kalianpur and from Kalianpur to Damargida, determined geodetically, were so little in excess as they proved to be of the same amplitudes determined astronomically,—a difficulty which he endeavoured to get over by attributing to the Indian Arc a curvature different from that corresponding to the mean meridian of the earth. In the present communication, introducing the condition that the length of the chord of the arc must be the same in both the ellipses, the local and the mean, drawn through the

stations at the extremities of the arc, he demonstrates that no change in the curvature of the arc, within reasonable and indeed within wide limits, can have any appreciable effect on the calculated amplitude. The author's conclusions from the whole investigation regarding the Indian Arc are thus summed up :—

(1) Colonel Everest discovered that the astronomical amplitudes of the two portions of the Indian Arc between Kaliana and Kalianpur, and between Kalianpur and Damargida, are, the first less by $5''{\cdot}24$, and the second greater by $3''{\cdot}79$, than the geodetic amplitude calculated with the mean semi-axes and ellipticity of the earth.

(2) The geodetic amplitudes of these two portions of the arc, calculated from the measured lengths and with the mean axes, will be sensibly exact, even should the curvature of the arc differ from that of the mean meridian within reasonable but wide limits—a thing which geology teaches us to be very likely the case.

(3) Hence the geodetic measurements of the survey being without sensible error, as is known by the tests applied, the discrepancy in (1) can only arise from local attraction affecting the vertical line, and so changing the astronomical amplitudes.

(4) Two great visible causes of disturbance of the vertical by attraction are, the Mountain Mass on the north of India, and the Ocean on the south. The influence of both of these is felt all over India ; the first producing a northerly deflection, varying from $27''{\cdot}98$ at Kaliana to a sensible angle (probably about $3''$, but this the author has not calculated) at Cape Comorin ; the second producing also a northerly deflection, varying from about $19''{\cdot}71$ at Cape Comorin to $6''{\cdot}18$ at Kaliana.

(5) The combined effect of these two visible causes is to make the astronomical amplitude of the upper arc $13''{\cdot}11$ too small, and of the lower $3''{\cdot}82$ also too small. They are therefore insufficient to account for the discrepancies pointed out by Colonel Everest. Some other cause must exist tending to increase the upper astronomical amtude by $13''{\cdot}11-5''{\cdot}24=7''{\cdot}87$, and also to increase the lower amplitude by $3''{\cdot}82+3''{\cdot}79=7''{\cdot}61$.

(6) It has been demonstrated that a slight but wide-spread variation in the density of the crust, from that deduced from the fluid-theory, either in excess or defect, such as there is no difficulty in conceiving to exist, is sufficient to account for deflections such as

these. For example: an excess of density amounting only to $\frac{1}{50}$th part, extending through a circuit of about 120 miles around the mid-point of the whole arc between Kaliana and Damargida (and therefore not far from Kalianpur), and to a depth of about 200 miles, will produce this effect, and make the calculated deflections from the three causes—the mountains, the ocean, and this hidden cause below—exactly accord with the observed errors in the astronomical amplitudes.

(7) The resulting total deflections at Kaliana, Kalianpur, and Damargida, arising from the three causes, are 26″·29, 21″·05, and 24″·84: these make the two astronomical amplitudes, the one 5″·24 smaller, and the other 3″·79 larger than the geodetic amplitudes, the error brought to light by Colonel Everest.

(8) No error can arise in the mapping of India by using the geodetic measurements. But the position of any places put into the map thus formed, the latitudes of which are determined from observations of the sun or any other heavenly body, will be wrong by the total amount of the deflection at those places, amounting in the three cases above to as much as half a mile.